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REVIEW OF SECTORAL CLUSTERS, SECOND PHASE: LAND, DESERTIFICATION FORESTS AND BIODIVERSITY

Integrated approach to the planning and management of land resources

Report of the Secretary-General

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INTRODUCTION

1. This document reports on progress made in the implementation of the aims set out in chapter 10 of Agenda 21 1/ (Integrated approach to the planning and management of land resources) since the United Nations Conference on Environment and Development in June 1992, and presents a set of recommendations for action. The report was prepared by the Food and Agriculture Organization of the United Nations (FAO) as Task Manager for chapter 10 of Agenda 21, in consultation with the United Nations Secretariat, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development at its fourth session. It is the result of consultations and exchange of information between designated focal points in 19 United Nations agencies, governmental officials, and a number of other institutions and individuals. A summary of its results and conclusions was presented to, and supported by, the FAO Council at its one hundred seventh session, in November 1994. Such a large number of issues are related to land that it has been impossible to do more than touch on some of the more relevant items in this short report.

2. The overall objective of chapter 10 is to "facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources". In doing this, environmental, social, and economic issues should be taken into consideration, and the rights of individuals and categories, such as indigenous people and women, are specifically mentioned. Much of the world's land is already settled and used for some purpose, and the aim is to move towards uses that provide greater benefits but which are sustainable in the long term, while protecting essential natural ecosystems and biodiversity values. Immediate objectives are stated as follows:

> "(a) To review and develop policies to support the best possible use of land and the sustainable management of land resources, by not later than 1996;
>
> "(b) To improve and strengthen planning, management and evaluation systems for land and land resources, by not later than 2000;
>
> "(c) To strengthen institutions and coordinating mechanisms for land and land resources, by not later than 1998;
>
> "(d) To create mechanisms to facilitate the active involvement and participation of all concerned in decision-making on land use and management, particularly communities and people at the local level, by not later than 1996."

I. GENERAL OVERVIEW

A. Objective

3. Land can be defined in a general sense as involving all attributes of the biosphere immediately above or below the terrestrial surface, including those of the near-surface climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes, and swamps), near-surface layers and associated groundwater and hydrogeological reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity.

4. Land, particularly the more productive classes of land, is finite in area, and human needs for land are many and varied. Thus the approach to land allocation that will satisfy those needs in the best and most equitable way must consider all land in relation to all needs. Land is required for the production of food, fibre, fuel and timber, for settlement, for recreation, for extraction of minerals, for water catchments, and for a wide range of ecological purposes. The way land is used affects all aspects of life, in particular standards of living and health and social and political stability. The many forms of environmental degradation, including deforestation, wind and water erosion, soil acidification and salinization, over-grazing, pollution, the extinction of plant and animal species, desertification, and even climate change and associated sea-level rise, are in a sense results of the inability of mankind to ensure sustainable land management.

5. While other chapters of Agenda 21 refer to land requirements and land-use planning in terms of individual aspects of the interface between land resources and human activities, the terms "land allocation", and "land management" in chapter 10 refer to the integration of all these separate needs and their interactions in an overall framework. In this sense the task is to facilitate the matching of land resources and land uses at every level in such a way that satisfaction of human needs and human rights is maximized on a sustainable basis. A balance must be struck between the need to increase production and raise living standards and the need to preserve the environment. The following major levels of planning and management need to be distinguished: global, regional, national, provincial or district, local, municipal or village, and household or farm.

6. It is essential that this exercise should cover both rural and urban land. There are reciprocal linkages between the city and the countryside. The former absorbs excess population from the rural areas and provides markets and services, and the latter provides food, raw materials, and recreation. The cities are also sources of pollution and are heavy users of certain natural resources. Peri-urban areas are frequently under great pressure to produce food and building materials, to provide recreational areas, and the necessary space for infrastructure of all kinds, and at the same time to absorb additional population, industry, and to dispose of pollution and other human and industrial waste. Cities and their associated infrastructure usually develop from settlements on land initially selected for its high agricultural potential, such as a fertile plain or valley, which is eventually built over and lost.

7. The programme of activities described in chapter 10 is intended to establish an overall conceptual and organizational framework for land resources allocation and management at each level. This framework should be made up of a number of modules, or procedures, which should begin with an inventory of land (and water) resources, a classification of land in terms of options for use, identification of needs, development of alternative action plans in collaboration with stakeholders, and implementation. Each of these stages should be further subdivided, and it is essential that action plans should cover all relevant social, economic and physical factors, including land-tenure issues, gender issues and others. Chapter 10 implies both physical planning, as usually carried out by the State or by local government organizations for the general good of the community, and land resources exploitation and management by individual land users. In both cases decisions need to be taken through a negotiation process with all those who are affected. It is therefore necessary to identify and reconcile the different sets of objectives of land users, communities, and governments, short-term needs such as food production, and long-term requirements such as the preservation of soil productive capacity, biological diversity, and global systems.

B. Land and people

8. When there were fewer people, there was no shortage of land for production, and environmental issues were minimal and localized. Under those conditions "land-use planning" was often not an important national or global issue, though at the community or tribal level, land resources management was often highly developed as a result of local population density. But human populations are now increasing with accelerating speed, already having doubled during the past 50 years to a present level of approximately 5.6 billion. At the same time, on average, food production grew faster than population because of better crop varieties, increased use of irrigation and mineral fertilizers, increased cropping intensities, and an expansion of the area under cultivation. There has also been a general rise in living standards all over the world.

9. A high price has been paid in terms of the environment for these results. It is very difficult to provide reliable data on the extent of land degradation world wide because of the difficulty of assessing and mapping the various forms of soil degradation and integrating the results. However, the Global Assessment of Soil Degradation (GLASOD) study 2/ indicates that 16 per cent of the total arable land surface has been damaged by recent human-induced soil degradation. The soils and natural vegetation of North Africa, the Middle East, Central Asia and parts of the rest of the world have become progressively more degraded and unproductive, in large part due to human activities over several thousand years. Until the first quarter of the present century, traditional land uses and production systems, which included terracing and various forms of grazing control, limited the rate at which land degradation was taking place. However, many of the most effective traditional labour-intensive conservation practices have now been abandoned, and widespread mechanization has caused a general shift to cultivation up and down the slope of the land. This, and the greatly increased area under irrigation, has led to a very marked increase in the rate of soil degradation over the past half century, to a point where, in many areas, it has reached catastrophic proportions. This very high rate continues in many

places where field crop production is mechanized and on steep lands newly cleared for cultivation. In many densely populated developing countries, soil degradation affects most of the land area, together with permanent overgrazing and deforestation. Tropical forests are being destroyed at the rate of about 15.4 million hectares per year. This in turn has resulted in accelerated destruction of plant, animal, and microbial habitats. It has been estimated that over the next 25 years more than a million species of plants and animals will become extinct. Water has become a scarce resource in many countries and regions, including many developed countries with temperate climates, and many water sources are now permanently polluted.

10. Degradation of the environment, particularly in cities, is having a serious effect on human health, the true extent of which is only just beginning to be realized. Pressure on productive resources is also responsible for poverty, hunger, and in many areas is the root cause of perennial social and political instability and migration. This migration is mainly a shift from rural to urban areas within developing countries, but also as continued high levels of migration flow between countries, and increasing interregional migration - particularly from developing countries with poor, fast growing populations, to developed countries. The number of refugees, asylum-seekers, and displaced persons, which has greatly increased in recent years, is also a factor to be taken into account (the number of refugees doubled from 8.5 to 19 million in less than 10 years, from 1985 to 1993).

11. The average figures for increased food production conceal the fact that populations have been rising much faster in some countries than in others. During the period 1988-1993 per capita food production actually declined in 99 countries, one third of which are in sub-Saharan Africa. For 1988/90 it is estimated that 20 per cent of the developing world's population was chronically undernourished. In many densely populated countries the average land area per head of population is now between 0.5 and 0.1 hectares only.

12. The human population is currently increasing by more than 85 million persons each year. It is expected to double again by the middle of the next century. More than 90 per cent of this increase is expected to take place in developing countries. The FAO study, entitled Agriculture: Towards 2010, which draws on all available information, shows that the per capita availability of arable land in developing countries is projected to nearly halve between the late 1980s and 2010, 3/ from 0.65 to about 0.4 ha. During the same period the share of land area required for human settlements is expected to increase from 2.8 per cent to 4 per cent of the total land area. The demand for recreational areas is likely to increase significantly. The forest area was estimated at 37 per cent of the total land area in 1990. The demand for forest products is estimated to increase from 238 million tons at the 1990 level to 440 million tons in 2010, and the pressure on existing forest lands will continue. Some of the deforested lands may have to be used for tree plantations, while others will become available for cultivation, but often at the cost of environmental degradation. On the other hand the demand to increase the size of protected areas is likely to increase as a result of growing environmental awareness. Most of the population increase will take place in the poorer countries with the least resources and where natural conditions are often least favourable. Unless a significantly more effective approach to land resources management is adopted

now, a possible scenario could include a large increase in poverty, hunger, social instability, war, greatly increased migration from resource-poor environments to more favourable ones, together with almost complete destruction of the remaining natural environment and possibly modifications to the world's climate which will cause social upheaval and political unrest on a vast scale. These are not things which may happen some time in the far distant future. They are already starting to happen, and the process may intensify exponentially over the next five or six decades unless appropriate action is taken.

13. In many industrialized countries the problems of land-use planning are of a different nature. There is often overproduction, with high productivity per unit of land, which is often associated with pollution and is maintained by a set of subsidies at both farm and export level, or a transformation of agricultural land into nature reserves or recreational facilities.

14. Countries in transition have some of the same difficulties, aggravated by organizational problems related to the transfer from public to private ownership.

15. The long-term relationship between humans and the land is represented by the institutions that make up a society's land tenure systems. These systems are the rules and practices which determine who has access to how much land and for what purposes. Where the existing land tenure system results in unfair rules to access, landlessness, or disregard for society's rules on usage is where aggravated ecological damage tends to be found. Landless farmers who invade forest reserves out of desperation, wildcat loggers who ignore regulations, and farmers with insecure land rights who make only the most rudimentary investments in land conservation are some of the most common examples.

C. A rational approach to land-use planning and land-resources management

16. Too often in the past land-use planning meant a top-down approach through which "planners" told ordinary people what they ought to do, and development programmes embodied the objectives of Governments rather than people. 4/ Failure to involve all stakeholders in the planning process has had three major consequences:

(a) Development programmes failed because they did not address the real objectives and needs of land users, who were therefore unenthusiastic about participation and seldom maintained the improvements created by the programme, which therefore had little or no permanent impact;

(b) Programmes were inappropriately designed because of lack of information on real constraints, social and institutional environments, and appropriate management structures;

(c) There was a failure to utilize the enthusiasm, knowledge, management ability, community values, and resources of those most directly involved.

17. At the level of the family or enterprise, land is a resource used to satisfy needs (such as food, money, and security). Land users rapidly respond to incentives which enable them to increase the level of those benefits, by raising output through increased investment in the land and higher levels of inputs and management. A prerequisite for this is that the land user must have security of tenure, so that efforts put into increasing productivity are protected. There are many different forms of land ownership and land tenure, many of them related to the development of rural societies over the centuries. The advantages and disadvantages of these different forms need to be taken into consideration and compared with national needs, laws, priorities, and equity considerations, as prerequisites for successful land-resources planning. Sale prices need to be such that labour and inputs are adequately rewarded (in other words, so that there is an incentive to produce). Information on better crop varieties, disease control etc. must be provided, together with physical infrastructure and markets. When the right conditions are in place, production will increase and conservation will be practised. Many social, legal, and economic factors are involved in creating the right conditions, and these in turn involve a host of different disciplines and institutions.

18. Put simply, the objective of the primary land user is to optimize continued output, of whatever kind. The objective of the community or nation coincides with this aim to the extent that national goals usually involve raising living standards, but national objectives also include broader aims, concerned with preservation of the environment and of natural resources such as water, soil, wildlife, and forests. It is therefore the task and aim of national Governments to create conditions and provide services which facilitate and encourage production but which also, through policies and legal instruments, allocate and control resource use in the interests of the community. Once again, different disciplines and institutions are involved, and many other sectors of the national economy impinge on or affect the land sector.

19. The functions of an integrated framework for sustainable land-resources planning are:

(a) To identify and clarify the set of conditions which enables and facilitates sustained utilization by land users;

(b) To put in place and maintain the necessary physical, informational, economic, and legal environment for this to take place;

(c) To develop at the national level the necessary structure to identify and support changing land-use options, protect the environment, make decisions relating to the use of land, and channel resources.

20. The necessary holistic integrated approach to the optimization of sustainable land use can be briefly defined as an operational programme covering a defined area of land and its population which methodically identifies human and environmental needs, identifies the potential and options for change and improvement, lists and evaluates all relevant physical, social, economic and policy factors, and develops, in consultation with all stakeholders, the series of actions necessary to permit and facilitate agreed changes.

21. The essential components of an integrated framework for sustainable land-use planning require that:

(a) Constraints are removed and incentives provided to ensure that desirable land uses are encouraged and are profitable; land users have legal title to their land; legal and tax systems do not result in disincentives to increased and sustainable land use; adequate market and physical infrastructure are available; the disadvantages and inequalities which particularly apply to women are remedied;

(b) People are involved and empowered to include identification of existing successful examples of methods which involve and empower groups of people and communities in the planning and management of land resources; factors and institutional structures which lead to successful management by groups and communities are identified; systems of joint management are propagated and encouraged; appropriate vertical linkages between decision-making forums at the local, district, national, and international levels are in place;

(c) The development of information and management systems to ensure that data needed for decision-making and monitoring are collected; appropriate systems of storage and dissemination are in place; information is available at no cost or at reasonable cost, and in an appropriate form, to all types of users; areas of importance by virtue of their environment features, natural resources, or history are located, surveyed and adequately maintained for the future;

(d) Institutions and the linkages between them are modified so that institutional responsibilities are clear and do not overlap; all concerned disciplines contribute appropriately to overall programme design and implementation; development is carried out jointly with the communities involved; required interfaces and communications links are established with groups responsible for all land-based activities, including industry, processing, marketing, banking, infrastructure development etc. to ensure the necessary inputs and support for the land resources sector but also to ensure that adequate provision is made for the safe absorption of waste products.

22. Sustainable development is not possible without the integration of land and water. Water is essential to human activities and to the functioning of all ecosystems. Water is required for human consumption, for biomass creation and for industrial production. It passes through the landscape and between the landscape and the atmosphere, and it is used and reused for many purposes. Water is important in terms of quantity and quality. Human activity affects both these factors and also the extent to which water causes damage and degradation through erosion, flooding, waterlogging and salinity. Any land-use plan must include the use of water.

23. Because of differences in climate and soil resources combined with efficient production systems, the potential for food production in developed countries often exceeds the consumptive requirements of their populations. Other countries with high economic growth rates are able to increase per capita food consumption partly by increasing their food imports. The countries which fare worst in this respect are those which suffer from war, political

disturbances, and economic stagnation. Therefore at the macro level an additional aim should be to create conditions of peace and stability which are favourable to economic growth.

II. REVIEW OF PROGRESS TOWARDS IMPLEMENTATION OF THE AIMS OF CHAPTER 10

A. Overall assessment

24. Overall progress has been variable in view of the target dates established in chapter 10. Awareness of the importance of negotiated land resources allocation and management and of the central role which such activities play in the development process has been growing. Some progress has been made in developing a relationship between governmental policy and land-user decision-making, in developing an integrated approach, in identifying key constraints, in providing all those concerned with relevant information, and in developing the means whereby they are able to participate in the development process. To encourage public involvement in decision-making, a number of countries have taken steps to make governmental information more freely available and have passed legislation which obliges the central government and local authorities to consult with the public in making policy decisions affecting land and the environment (for example, the New Zealand Coastal Policy Statement), and in formulating district development plans. Since UNCED, many countries have begun to address land-related issues as a whole, through the establishment of new ministries of the environment or departments of land-use planning and through the declaration of policies designed to provide a framework for operational programmes. Some examples of these initiatives are the Sistema Nacional de Desarrollo Sostenible (Costa Rica), the Programme national de gestion du territoire (Burkina Faso), and the Green Plan (Namibia).

25. At the international level Governments have adopted the International Convention to Combat Desertification in those Countries Experiencing Severe Drought and/or Desertification, particularly in Africa. Efforts have also been made among agencies to develop a strategic planning framework which will optimize results from a shrinking budget at the international level.

26. Institutions, agencies, individuals and a number of universities, some under the aegis of FAO's Inter-Departmental Working Groups on Environment and Sustainable Development and on Land-Use Planning, have been studying the relationships between policy, the social and economic environments and land use. FAO also produced several publications, The State of Food and Agriculture, 1993, 5/ Agriculture Towards 2010, 4/ and Guidelines for Land Use Planning, 6/ and together with other specialized agencies and institutions, it published numerous other publications and studies on one or other aspect of the subject.

27. In the areas of planning, management, and evaluation procedures, there has been technical progress over the past two years in concept development, development of databases and other computer-based systems, and in information products required for decision-making. Examples are the soil databases being developed by FAO and the International Soil Reference and Information Centre (ISRIC); land-use analysis concepts and database developed by FAO and the

International Institute for Aerospace Survey and Earth Sciences (ITC); a joint initiative of the United Nations Environment Programme (UNEP), FAO, the United Nations Centre for Human Settlements (Habitat), the United Nations Educational, Scientific and Cultural Organization (UNESCO) to develop international land-use and land-cover classifications; further development by FAO of more precise decision-support systems, and the expanded use of remote sensing to map and monitor various aspects of land, including the FAO AFRICOVER project and the IGBP-DIS land cover map of the world, planned for completion by 1997. As greater contact develops between specialists in this group of fields, systems such as Email are playing a significant role. However, though the methodology is being created, it is still only beginning to be introduced on a practical basis, particularly in developing countries.

28. In relation to the creation of mechanisms for the involvement and participation of communities and people at the local level, the activities of many non-governmental organizations and special interest groups should be mentioned. These are being increasingly recognized, consulted, and brought into the decision-making process. In a few developing countries self-help groups are being supported by non-governmental organizations. But a distinction needs to be made between this and statutory procedures designed to ensure that each individual having an interest in or likely to be affected by environmental factors or changes is empowered to participate in the discussion and decision-making process. Some examples of this are the Microbacias programme in Brazil, the Land Care programme in Australia, the Primary Environmental Care programme promoted by the OECD-DAC, the Integrated Catchment Management approach by the National Rivers Authority in the United Kingdom, the Farmer-centred Agricultural Resource Management Programme operating in Asia (FAO, UNDP, and UNIDO), the village land-management approach currently being implemented in several onchocerciasis-treated areas of West Africa, 7/ and the Community Management Areas in Burkina Faso. 8/ Mention may also be made of the Visual Planning System developed by UNCHS (Habitat) for both urban and rural application.

29. At the community level, locally agreed allocation arrangements may be the most effective method for protecting natural resources. Resources are often best protected by the local population's activities for allocating land to farming, grazing, and forests. Local agreement is often much more likely than national policies to decrease deforestation, because local communities benefit from the remaining woodlands and have a stake in protecting them. Similarly, reserving certain areas for herding through local agreements, such as the allocation of rangelands in Iran to nomadic tribes, may prevent encroachment on soils unsuitable for sustained production and maintain space for livestock. Local management and apportioning of scarce water resources can be equally effective; an example of this approach is the Keita Valley development project in Niger.

B. Major issues and challenges

30. World trade and its effects on prices for agricultural products have an important impact on incentives to develop land sustainably and on the rate of exploitation of raw materials and degradation of environments, in developing and industrial countries alike. Reduction of pollution and environmental

degradation are problems in all countries, especially in the vicinity of settlements and industrial areas. In all countries there is also a need to identify and conserve key areas of environmental importance and biological diversity. Many environmental issues affect more than one country - for example, the management of upper catchment areas of large rivers, the protection of coastal zones, the migration routes of birds and land animals, and deforestation, which affect global systems.

31. There is still a lack of sufficiently detailed information on land resources, at the national, and regional and global levels. The institutes of the Consultative Group on International Agricultural Research (CGIAR) need digitized climate, soil, and land-use information to support the extension of improved crop varieties to appropriate areas and to develop crop varieties adapted to marginal areas. The World Soil Map, published in 1987 at a scale of 1:5 million, is too small for district-level or village-level development work unless complemented by detailed information collected by national institutions. The same holds true for socio-economic information; methods of rapid rural appraisal provide the possibility of collecting at least some of the social and economic information for sustainable land resource development, but they have not been systematically applied.

32. There has been some strengthening of institutions in developing countries on an ad hoc basis through technical assistance programmes and by national institutions on their own, in both developing and industrialized countries. The major problem - lack of coordination or collaboration between sectors, disciplines, and institutions - has hardly been addressed, except informally, through the development of personal contacts. The problem of overlapping responsibilities is severe in many countries.

33. The involvement of rural populations, especially women, in the planning, formulation and implementation of agricultural policies and programmes remains marginal.

C. Developed countries

34. Population density in parts of many developed countries is among the highest in the world, and the standard of living and number of households is increasing rapidly. This has led to a massive expansion of urban areas and associated infrastructure and placed increasing pressure on land and water, energy and other natural resources. Agriculture has had an impact on the environment in a number of ways - high levels of fertilizers, herbicides and pesticides on arable land; excessive enrichment of some waters, particularly by nitrogen and phosphates as a result of intensive animal production; drainage of wetlands; and soil erosion on hilly areas due to the expansion of cereal production. In addition, past and present industrial use of land has left a heritage of pollution, much of which is highly toxic. All these factors have reduced the number of species, damaged or eliminated feeding areas and interfered with migration patterns, and modified natural environments. Consequently, there is now a rapidly increasing need to identify and protect areas of key environmental importance for the maintenance of natural plant and animal populations or unique ecosystems.

35. An increasing desire among developed countries since UNCED to implement sustainable development policies has encouraged some of these countries to create multicriteria knowledge-based information systems and to up-date and digitize land resource surveys carried out during the 1960s and 1970's in order to create computerized databases and Geographic Information System (GIS) systems. Remote sensing is also currently being used to create digitized land cover and, by inference, land-use databases and maps for many developed countries. Some progress has been achieved with the reduction of subsidies to unsustainable agricultural practices and in the provision of technical and financial assistance to those land users adopting preferable practices. For example a law introduced in Hungary in 1992 allows a 50 per cent reduction in the land tax if the farmer adopts sustainable technology. Price subsidies and mineral fertilizers and pesticides have also been eliminated.

36. Land evaluation techniques are still fairly rudimentary and qualitative, as is conflict resolution and decision-making. The most common approach is top-down zoning, together with by-laws and subsidies to control or influence use in each zone. These may limit the management rights of the landowner or land user, the stake which he or she holds in the land, and therefore the incentive to manage for the long term. The effect of taxation regimes current in some developed countries may also discourage improvements of a long-term nature. The functional relationship between governmental policy and land use is still little understood, and existing and well entrenched institutional structures are ill suited to a holistic approach to natural resource and environment planning. Many developed countries are currently interested in the land management planning tools being developed by a few institutions and agencies, but programmes to extend their use to all levels are not yet in place. 9/

37. Certain countries have developed systems of ecological zoning, which they are using as a basis for identification of threatened ecosystems and development of ecological modelling at various levels, from the regional and national to the level of individual natural habitats. Others have established ecological monitoring systems, but there is as yet little development of procedures and institutional structures to enable integrated and logical action on the basis of the results.

38. Some developed countries have produced successful models of consultative management and implementation groups at local levels, sometimes on a hydrological catchment basis, and sometimes at the level of an ecological system or biome.

39. A number of countries have developed national land-use policies and plans, such as the Japanese Comprehensive National Development Plan, which includes a National Land Use Plan, which itself covers Land Use Master Plans for individual prefectures. In terms of individual programmes, mention may be made of the set-aside programme developed by the European Community, the "Sodbuster", "Swampbuster", and Farm Bill laws in the United States, Land Care in Australia, and Ecological Infrastructure Planning in the Netherlands.

1. Key issues

40. The need for protection of the environment is an important issue in developed countries - in particular, the protection of key habitats and centres of biodiversity, together with control of pollution and rehabilitation of former industrial sites. Important issues are the widespread acidification of soils due to industrial pollution and the lowering of water tables and reduction of river flow due to high rates of extraction.

41. Attention also needs to be drawn to the issue of population redistribution. This applies to depopulation of rural areas and also to absorption of an increasing flow of migrants who are a consequence of the difficulties that developing countries face in raising food production and living standards at a faster rate than population growth, when a significant proportion of their populations are still directly dependent on agriculture.

42. Unsustainable consumption patterns and the disposal of waste products of many kinds, some of them toxic, are increasingly important problems in these countries.

43. Because of the increasing density of population, paralleled by an enhanced appreciation of nature and the environment, of heritage values, and of the health hazards associated with certain kinds of land use, a need is arising for the general introduction of the concept of land-user covenants which embody a responsibility to the community and custodianship of the land by the user for future generations (see proposal 7 in sect. III below).

D. Developing countries

44. In developing countries the situation varies enormously as regards availability and application of information, development of procedures involving local communities in decision-making, and institutional development. Few countries have made progress in collecting land-use information and storing it in digitized form or in developing the necessary procedures or institutional framework for integrated and sustainable land resources management.

45. A number of Asian and some Latin American countries have carried out national land resource and land use surveys covering climate conditions, soils, land forms, rangeland, woodland, and forest resources and have developed land evaluation systems. They have also taken steps to develop institutional structures capable of formulating integrated plans and policies and to implement them in collaboration with land users. For example, in Colombia, municipalities play a decisive role in rural development through municipal technical assistance units; in Chile municipalities have entered into agreements with national rural and forest development institutions to implement education, extension, and investment programmes. These and other countries in Latin America have also transferred important functions to land-user associations, cooperatives, and other non-governmental organizations. Some countries have also prepared national Agenda 21 programmes which give an important priority to land-use planning.

46. Some of these countries possess a sufficiency of skilled technical personnel, though they face budget limitations in the development of land-use planning systems. What is most needed is an exchange of information with similar countries, technical workshops, and regional institutions that facilitate international contacts between the staff involved in all aspects of these programmes. An example of joint action by a group of such countries is the programme of ecological/economic zoning initiated by the Special Commission on the Environment of the eight-country Amazon Cooperation Treaty in 1994, in which Brazil has played a leading role, with FAO in a supporting capacity. Bolivia has recently completed an exemplary detailed zoning for its part of the Amazon region, with full participation of all stakeholders. It is now extending this approach to other ecological zones of the country.

47. A number of other countries, in Africa, Latin America, the Middle East and elsewhere, have carried out land resources surveys of various kinds in the past and possess paper maps which can be used for basic land development purposes. In many of these countries, the establishment of methods to capture and record original survey data in digitized form has begun.

48. At the other end of the scale are countries that have little quantified information on their natural resources and whose populations practice subsistence agriculture supplemented by remittances from members of the family who are in paid employment elsewhere. In these countries, since the population expands but land-use technologies do not change, degradation of the landscape is severe. Deforestation, over-grazing, and wind and water erosion are all but universal; poverty is the norm for a large proportion of the people; there are periodic food shortages and frequent social instability and armed strife. These countries are the most in need of technical and financial assistance.

49. Many developing countries have continued to receive technical assistance on natural resources assessment and development from multilateral and bilateral sources. Initially this was aimed at resource mapping, more recently at land evaluation and land-use planning. Technical assistance programmes have typically been of a short duration and have usually been narrow in scope, involving one or, at most, a narrow range of disciplines. Their chances of success have been limited by factors outside the control of the project, such as unwieldy, inequitable, or insecure tenure systems, economic factors, or bureaucratic structures. Some progress has been made over the years, such as the move from a project to a programme approach and the more holistic design of conservation programmes. A basic reason for lack of success has been failure to develop "development" as a discipline in itself, together with a holistic and integrated approach which combines the physical, social, economic, and policy aspects of natural resource use. This is the weakness that now needs to be addressed.

50. Little progress has been made in developing a relationship between governmental policy and land user decision-making. Few countries have an effective institutional structure for land resources development and conservation, and in some developing countries there is no effective institutional basis to support legal land tenure. In this respect an excellent initiative has been recently taken in the Dodoma region of the United Republic of Tanzania in which village and even plot boundaries were agreed through an

interactive process between local villagers and government survey staff. Land management in the Machakos district of Kenya and village-based land management in West Africa are also encouraging signs.

51. Land tenure reform can have a very positive effect in achieving the goals of Agenda 21. China, for example, has been issuing long-term secure leases to hillside land to those who are willing to plant trees. Pole wood sales are perfectly elastic in contemporary rural China, and those who can produce them are often earning more per hectare than grain farmers. Thus, for the first time in a millennium, more trees are being planted than cut. In addition, a change from social property and its related central planning to models based on private property have resulted in a great reduction in an overdependence on chemical fertilizers and pesticides and in water pollution from poor farming practices. Well thought out land tenure reforms can serve as a powerful tool in stimulating land users to choose sustainable practices that enhance their security of tenure while increasing earnings.

1. Key issues

52. In many developing countries the most important issue, in both the rural and the urban contexts, is the need to provide the occupier and user of a piece of land with a clear legal title to it. But while security of occupancy and use must be provided, some restrictions on how the land is used will invariably be necessary in the direct interests of the community and in the broader interest of conservation of the environment.

53. In many developing countries land-use planning systems and procedures are undeveloped and comparatively ineffective. There is often a severe shortage of trained and experienced staff in this field and severe budget limitations on procurement of equipment. Often there is a multiplicity of institutions involved, with overlapping responsibilities. Bureaucratic constraints to development of effective procedures and decision-making processes are sometimes considerable. In the past, in many of these countries effective traditional land resource management systems existed. Most have fallen out of use due to the introduction of new forms of government and because in some cases they were incompatible with present living standards and expectations. In some countries there remains a tradition of joint discussion and decision-making at the local level which might be utilized in the future.

54. It is often difficult to locate funding for the collection of the necessary information to be used for rural or urban land resource development or for paying for the development of the necessary technical tools and institutional improvement, partly because they are not perceived as producing an immediate impact. Until now land-use planning has not been developed as a tool for decision-making at the village or household level, and consequently extension services are often largely ineffective. Modern tools such as geographical information systems would, in principle, make data processing quicker, cheaper, more transparent and more objective. Once this is understood, funding may be easier to obtain. During the past two years there has been some progress in the digitization of information already contained in maps and reports, and subsequent processing for planning. In some countries there is need for

external assistance to fund "rescue operations" to save valuable data that were collected in the past but that are now being lost or destroyed.

55. There is need to develop public awareness and stimulate public debate on the importance of natural ecosystems and the range of animal and plant life which is threatened by continued expansion of human activities and consequent transformation of landscapes, depletion of water resources, and all forms of degradation and pollution.

E. Countries with economies in transition

56. These countries are currently in the process of transferring large State-owned enterprises to various forms of private ownership, which include partnerships, cooperatives, and private enterprises. Such a huge task involves questions of equity, and, in some cases compensation, land surveys, and legislation. In most cases the two latter activities lag far behind, which may cause serious problems.

57. Many of these countries are suffering severe problems of environmental degradation and pollution which, in some cases, impinge on global systems. Considerable time and funding will be required to correct the practice of not accounting for all costs at the enterprise level. Basic resource data are often available, as are the necessary skills. But they are dispersed, and at present specialist staff and institutions are often demoralized and disorganized. Basic institutional structures exist, except for those needed for interaction with the new majority of land users.

58. There is growing awareness of the problem of environmental degradation, and much of the information necessary for planning more sustainable land and water resource use exists, together with the necessary skills. One example is the new Soil Information and Monitoring System, in Hungary. It covers 1,400 observation points - 1,000 on agricultural land, 200 in forests, and 200 in areas threatened by environmental degradation.

1. Key issues

59. Several of these countries have pressing problems relating to food production and living standards and are short of funds for implementation of projects aiming at the preservation and improvement of resources. There are also bureaucratic problems, problems of overlapping responsibilities, and problems stemming from single-sector approaches.

60. There is urgent need to update cadastral maps and land registration systems and to address questions of equity, land reform, and security of land tenure. The current transition period provides a window of opportunity for enlightened land-use planning to match land resources with most suitable uses.

61. A particular problem is the need to decontaminate and rehabilitate industrial sites and lands that were formerly under military control and that have become degraded or polluted by toxic substances.

62. Two types of assistance are required. One is funding, for programmes and equipment. The other is provision of a structure for consultation and exchange of information between these countries and with other countries and international institutions. Frequently competent professional staff know what has to be done and what the priorities are but are hindered by bureaucrats and lower-level officials, in many cases afraid to take responsibility. If it can be shown that proposals have been approved internationally, the problem is often reduced.

F. Major groups and non-governmental organizations

63. It is difficult to identify progress by the major groups, as defined in Agenda 21. This may be because few land development or natural resource management programmes are specifically oriented towards women, children or young people, indigenous people, or workers, except for the indigenous groups covered by the ecological/economic zoning being carried out under the Amazon Cooperation Treaty.

64. Increasing responsibility has been given to indigenous people and tribes in the planning and management of natural resources. This has facilitated the implementation by national Governments of development programmes and hastened their progress towards decentralization and the implementation of UNCED recommendations, especially in relation to chapter 10.

65. Non-governmental organizations can be divided into those representing the interests of groups, such as farmers and planners (an example is the International Network of Green Planners), and those providing technical assistance, mainly at the community level and mainly in developing countries. Non-governmental organizations are providing valuable assistance to land users at the village, watershed, or district levels. They tend to represent the interests of the individual or local community, and it is not always realized that such interests are often legitimately different from those of the country as a whole, and therefore of the Government.

66. The international scientific community is closely involved in aspects of methodology development and environmental monitoring, and land users, the business community, and local authorities are bound to benefit to the extent that progress is being made in this field.

1. Key issues

67. In many countries rural communities have suffered because of a tendency for rural areas to become depopulated. This has often resulted in cultural deprivation, lower standards of service and infrastructure, and failure to maintain the productivity of land. Examples of the latter are the neglect of terraces or drainage systems that ensured the sustainability of cultivated land and the breakdown of management systems of, for example, wetlands or forests. The ILO has drawn attention to the social implications of land-use management practices, including the concept of "sustainable livelihoods".

68. In many countries women have traditionally been environmental resource managers. This role has often intensified as men shift their efforts towards cash-earning activities elsewhere and as more men migrate from rural to urban areas. Women farmers grow most of the food in some regions. Women are often the caretakers and harvesters of food, fuel, and other products. The threats to the environmental resources base - degradation of agricultural and grazing land, deforestation, and increased scarcity of firewood, the advance of desertification - are all contributing to the pauperization of already poor women. To this are added the negative effects of structural adjustment, which are often felt disproportionately by the poor, the "invisibility" of women to development planners, and the many forms of societal discrimination against women. Some development projects, by neglecting to determine the gender-differentiated roles of men and women, further undermine the status of women. Women need to have access to training in sustainable agricultural methods and techniques. It is particularly important to note the disadvantage that women often face in their ability to own land, inherit it, or obtain credit on the basis of it.

69. Agenda 21 calls for the economic role of women to be taken into account; for both men and women to be provided with the information necessary for decision-making on land-use planning and management; and for enhancing local management capability, particularly that of women. Disappointing progress has been made in providing such rights and services since UNCED. The Informal Round Table of Experts on Rural Women, Population and Environment in South-East Asia, held in February 1994 and organized by the FAO Regional Office for Asia and the Pacific, is an example of what can be done.

70. There is need to develop further a partnership relationship between Governments and non-governmental organizations which would be complementary in terms of strengths and weaknesses. Since UNCED, a number of active non-governmental organization networks have emerged. They provide potential contact points between the non-governmental organization community and international organizations. Some United Nations agencies have a strong tradition of collaboration with non-governmental organizations. FAO and IFAD have created cooperation programmes which are a source of funding for non-governmental organizations.

71. More could be achieved through the involvement of educational institutions of all kinds in the development of sustainable land management practices at all levels and in establishing a wider appreciation of land and environment-related issues.

G. Finance and technological capacity

1. Finance

72. Specific financial and policy measures which have been shown to be successful in promoting higher sustainable production include the following:

(a) Support to the development of community-level land-use planning and management schemes;

(b) Tapping the enormous potential in the ability of local groups to plan and manage their own resources, if permitted and encouraged to do so. Government costs for such schemes are relatively low, since they consist of only support, provision of information, and the development of procedures which ensure that the management systems are truly democratic. Constraints to the rapid development of such an approach are lack of clear policy decisions on the part of Governments to encourage such schemes and the difficulties of communities to obtain credit for development. A successful example of how to solve this problem is the Grameen Bank in Bangladesh and the Farmers Agricultural Credit Groups in Sri Lanka and Bolivia, the latter set up with the support of FAO's Plant Nutrition Management Programme. The components of such schemes are a clear and promulgated government policy, an invitation to groups to come forward with proposals, institutional support to provide information, and availability of credit;

(c) Tax structures designed to encourage investment in the improvement of land resources in the long term and to reward investors who buy degraded land and improve it. An example of this is a new tax system in New Zealand under which the cost of producing a crop of trees is deductible from income as a whole in the year in which the trees are planted rather than at the time of harvest. There is also the possibility of identifying preferred land uses for each land type and providing tax advantages to encourage their adoption. It is now possible to monitor land use by satellite, and countries such as Brazil, Canada and the EC group are currently developing systems to do so;

(d) Financially self-sustaining systems based on demand for legal titles to land. It has been shown that land users are willing to pay for cadastral services if they result in legal titles to land.

73. Additional policy options in the financial field include:

(a) Tailoring the Global Environment Facility to cover the vast range of activities directly related to introduction and maintenance of sustainable land use, while avoiding land degradation and its effects on global and local climate systems;

(b) Further investigation of possibilities initiated by the World Bank for direct investment in enhancing land productivity and soil fertility. This would have beneficial effects in terms of production, profitability (and hence, a reduction in rural depopulation) and sustainability.

74. The key to success in land-use planning and management for sustainable use is felt to lie in an integrated approach based on partnership with the land users. This requires adequate governmental support in a variety of different areas, and the Governments of less developed countries will continue to require technical and financial assistance from donors. This should not be haphazard and uncoordinated, as in the past, but should be based upon a land resource management and development plan for each country.

2. Technological capacity

75. The need to strengthen technological capacity is highlighted in chapter 10 of Agenda 21. Governments are urged to promote focused and concerted efforts for education and training and the transfer of techniques and technologies that support various aspects of the sustainable planning and management process. 10/

76. Relevant aspects of technology are:

(a) The mapping, definition and analysis of land resources and ecosystems;

(b) Identification of sustainable land-use options;

(c) Improvement of production and management systems;

(d) The mapping and registration of land holdings;

(e) Methods of providing information and platforms for negotiation (social technology);

(f) Environmental and land-use monitoring;

(g) Dissemination of information for decision-making and management.

77. Taking all countries together, comparatively little progress has been made in the development of land-use planning mechanisms for identifying objectives, at the global, national, community or individual family level. Some progress has been made in the collection of the necessary physical data, and rather less in the collection of the necessary social and economic data. Practical multiple criteria analysis procedures applicable at the various levels are beginning to become available to support decision-making.

78. There are some models for resource management at the community level, but although there has been much discussion about the need to involve local communities, there has been comparatively little practical demonstration of how this can be done. FAO's recently published Guidelines for Land Use Planning 6/ provide advice in this area.

79. The advent of computers and computerized data storage has revolutionized the field of land resources planning. It is now practical and economically feasible to store, access, analyse, assess, and combine the mass of disparate data on soil, topography, climate, water resources, land use, populations, costs, social factors and so on which have to be taken into account. For some years it has been possible to overlay layers of thematic information, to take into account the ecological requirements of crops, model the effects of production systems, and predict levels of output and environmental impact. FAO's Agro-Ecological Zoning methodology 11/ is an example which has been applied at the continental, national, and district levels - the latter, for example, in China and Kenya. A closely related but less developed approach which stems from the Framework for Land Evaluation, 12/ and which can be applied down to the farm level, defines land units, matches them with possible uses to identify and quantify use options, and facilitates selection of the best mix of options in

relation to production costs, sale prices, markets, resources and, most importantly, objectives and needs.

80. Standard database structures have been developed and have been in use for some time for soil and terrain data, climate data, water resources data, crop environmental requirements data, land use information, and other data groups. Computer hardware and software is becoming substantially cheaper, and the level of computer literacy is rapidly rising.

81. Remote-sensing techniques now provide the means to survey and monitor large areas quickly, frequently, at relatively low cost, and in rapidly increasing detail. In the future, hand-held global positioning systems (GPS) will be increasingly used to provide precise geographical locations for all types of data.

82. But though the technical system methodology exists, it has not been fully linked with the social and economic aspects of the total picture, and in all fields there is a lack of the detailed information which is needed for projects or area programmes. The depiction of spatially diverse social and economic aspects in a GIS system, with in-built capacity to reflect changes over time, is still in its infancy. Arrangements for systematic involvement of all stakeholders in actual or potential land resources planning and management at the national, district, and community levels, through the creation of "platforms for decision-making" are still rather rare.

H. Institutional structures

83. In many cases technical answers to the problems of sustainable development and environmental protection are known, but humanity is as yet unable to develop the social and economic means to apply them. This is particularly the case with regard to land, which is the basis for most food production but which is used for many other purposes and is simultaneously the direct basis for livelihood for a large part of the world's human population and for a vast number of valuable ecological systems.

84. Existing institutional structures are very largely sector-oriented. Ministries or departments of the environment, planning, land, local government, agriculture, forestry, health, trade and many other sectors all deal with matters that affect how land is used. Overlapping responsibilities are very common. Established institutions tend to resist change successfully. Although a number of environmental protection agencies and ministries of the environment have been established, effective cooperation is still lacking in many countries. Since institutional structures are unlikely to change significantly in the foreseeable future, the only practical approach is to build a system of linkages in the form of interdisciplinary and interinstitutional working groups. Such forums are necessary at all levels.

85. Capacity-building must also be mentioned in relation to institutions. In institutions all over the world there is need for reorientation and development of integrated strategies. In developing countries and countries with economies in transition, there is need to provide staff with technical and professional

training. Schools and universities need to devote curriculum space to land resource issues.

I. Recent developments and experiences in international cooperation

1. Intergovernmental processes

86. There is a growing realization of the need for action. Some countries have sponsored activities, such as the Conference on Sustainable Agriculture and the Environment (1991) and the World Coast Conference (1993). The Global Conference on the Sustainable Development of Small Island Developing States also gave high priority to land-use planning. Guidelines for the integrated planning of coastal zones have been drawn up. The Netherlands Government is planning to host an international workshop on the integrated planning and management of land resources in February 1995. But as yet, such efforts are uncoordinated and do not take place within a mutually reinforcing global framework. There is danger of fragmentation and dissipation of resources and effort and even of the growth of conflicting views and technical procedures. Avoidance of this is particularly important in view of the need for standardized collection, classification, storage, and processing of land resources information.

87. There is no international agreement or programme specifically aimed at land-use planning. There have been a number of agreements dealing with related subjects, such as the International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (which stresses interdisciplinary and participatory approaches to the preparation and implementation of national desertification action plans), and several river basin treaties such as the Amazon Cooperation Treaty, the IGADD agreement on the Nile Basin and the Mekong Basin Committee.

2. Organizations of the United Nations system

88. Agencies, such as FAO, UNCHS(Habitat), the World Bank, and to an extent, IFAD and UNEP, work at all levels, from global to farm to municipality, and deal with all aspects of land resources planning and management. It is not possible in the present report to mention more than a very small fraction of their activities.

89. FAO has initiated collaboration with other United Nations agencies in the development of land cover and land-use classification systems suitable for widespread application, and work is leading to collaboration in related fields. An important project to map land cover and land use on the African continent has recently become operational (the AFRICOVER project). Over the past two years FAO has also expanded its Special Action Programme for Land Conservation and Rehabilitation. The Special Action Programme for Water and Sustainable Agricultural Development (WASAD) gives increasing attention to the linkages between land and water. Agroecological zoning has been carried out in Bangladesh, China, Kenya, the Caribbean, and other areas. FAO's Integrated Plant Nutrition Programme is being reoriented on the basis of an integrated

approach to the management of soil, water, and plant nutrients at the farm level. Through its regular programme and field projects, the organization implements many initiatives that directly support the objectives of chapter 10. It is also actively developing an interdisciplinary approach through its Inter-Departmental Working Group on Land Use Planning. The FAO Land Regularization Task Force (LRTF) has been involved in land consolidation and land registration activities in many countries, including a number in Eastern Europe.

90. An important task of UNCHS (Habitat) is to provide for the land requirements of human settlements. Programmes focus on key issues such as competition between different land uses; access to land, provision of water, sanitation, and energy; and conservation of land resources in and around settlements. An example of inter-agency collaboration is the UNDP/Habitat/World Bank Urban Management Programme. Another is the Sustainable Cities Programme. At the local level, support is given to the development of spatial planning and land registration programmes; at the community level priority has been given to land tenure regularization and the development of cadasters and up-grading of land registration services.

91. The activities of UNCTAD are based on the premise that one of the most important requirements is for policies which provide sufficient economic incentives to rural communities for the adoption of sustainable management practices.

92. The development and implementation of national land-use policies, land tenure systems, and land-use planning processes are key activities under the National Environmental Action Plans which have been prepared by the World Bank for developing countries since 1992. Many have been completed in Africa, Latin America, and the Middle East. The World Bank also prepares country environment strategy papers which define principal environmental and natural resource management issues for countries and define the Bank's strategy for addressing those issues.

93. The World Food Programme (WFP), through its food-for-work programme, has carried out large numbers of projects in support of afforestation, irrigation and drainage development, conservation, and infrastructure development. WFP is moving to support community initiatives to plan and manage land resources. In several Indian states, for example, WFP projects use funds generated through forestry projects to support tribal communities in planned development of their lands. Local non-governmental organizations assist the communities to articulate their needs and manage new forestry or agricultural assets.

94. WHO has drawn attention to the relationships between the occurrence of disease vectors and land use. Examples are onchocerciasis and river valley development, and the control of malaria and schistosomiasis in irrigated areas. The joint WHO/FAO/UNEP Panel of Experts on Environmental Management of Vector Control (PEEM) is a good example of inter-agency cooperation in this field. WHO is currently assisting a number of countries to strengthen their health-sector capacity in the area of GIS at the national and, where possible, the municipal levels.

95. The work of national meteorological and hydrological services is coordinated at the international level by WMO which has established a degree of standardization in the manner in which climatological and hydrological data and information are collected and analysed. The organization's Hydrology and Water Resources Programme plays a similar role with respect to information on freshwater resources.

96. Some of the ILO's objectives relative to indigenous and tribal peoples for the 1990s include the promotion of a platform for different levels of government and other parties to develop a shared understanding of the major problems and hopes of indigenous and tribal peoples and to collaborate in the diagnosis of relevant environmental issues and in the identification and implementation of solutions. These would include land tenure security and the right for the indigenous and tribal peoples to participate in the use, management and conservation of natural resources pertaining to their lands. This work forms part of the ILO's efforts to promote the ratification and implementation of an indigenous and tribal people's convention. Under a project for strengthening pre-cooperative rural organizations in Bolivia and Peru, the ILO is managing the legal education component. This consists of training indigenous local authorities as to their rights and obligations in terms of land-use planning and management under the ILO's normative framework and in ways to improve law enforcement.

97. UNEP published a series of guideline documents on the integrated sustainable management of land resources. UNEP was instrumental in the preparation of a Global Assessment of Soil Degradation (GLASOD). It stimulated the development and application of Soil and Terrain digital databases (SOTER) and, together with FAO and the International Society of Soil Science (ISSS), executed a number of projects for national soil policies.

98. The Economic and Social Commission for Asia and the Pacific at its second session in October 1994 considered a paper on land-use planning for sustainable development prepared by the Secretariat. 11/ This discusses issues and provides information on programmes in the region which relate to the subject. The Economic Commission for Latin America and the Caribbean (ECLAC), in cooperation with UNEP, conducted a study on the application of economic and policy instruments designed to address the environmentally sound and sustainable development of key productive sectors such as agriculture and forestry. No further information on the activities of the regional economic commissions specifically related to the implementation of chapter 10 is as yet available to the task manager.

99. The organizations of the United Nations system feel that development of a wider exchange of experiences and information is essential. It is clear that there are overlaps between the activities of the various agencies in relation to land resources development and management and that considerable benefits could result from rationalization and closer collaboration. This can be achieved through development of a joint approach, development of collaborative programmes, and greater use of joint working groups, to be initiated by the task manager.

3. Organizations outside the United Nations system

100. A number of non-governmental or semi-governmental organizations have recently come into existence as a result of interest in a perceived threat to global systems, many under the auspices of the International Council of Scientific Unions or the Third World Academy of Sciences. These include the IGBP group of programmes. One of them is the proposed monitoring of changes in natural and managed ecosystems through a global terrestrial observing system, which is also supported by FAO, UNEP, UNESCO and WMO, and would complement similar arrangements already in place to monitor climate and oceans. The IGBP programmes are active and institutionally well supported but are more science- than people-oriented. However they have begun to cooperate with the Human Dimensions of Global Change programme of the International Social Sciences Council. Mention should also be made of the activities of the International Union for the Conservation of Nature, the World Resources Institute, and the International Institute for Environment and Development.

III. CONCLUSIONS AND RECOMMENDATIONS

1. Main conclusions

101. The greatest constraint to development of more productive and sustainable land use is probably the present fragmented and sector-oriented approach to the matching of land resources and human needs for land. Typically, at the present time, issues relating to the use of land are the responsibility of a host of different organizations, none of which is in a position to take a holistic view or develop an approach that covers all related factors. Thus, for example, an agricultural extension service may strive to persuade or assist farmers to increase production even though low prices may fail to provide an incentive for them to do so; conservation services bewail the fact that land users perversely refuse to see the advantages of conservation practices even though land tenure systems may provide no security for the necessary investment; grazing or forest management schemes provide insufficient incentive to the participants, local people are denied the benefits of wildlife management programmes and consequently view wildlife only as dangerous pests which should be eliminated.

102. There is need to review more explicitly the relationship between policy and land use. The relationship between policy and economic and social conditions, on the one hand, and land use and its impact on the physical, social, and economic environment, on the other, has not yet been clarified to the point where desired effects can be achieved.

103. Advances have been made in the development of tools and technology necessary to support more productive sustainable land use, but much less progress has been made in creating the capacity to apply these tools routinely in all countries, and there is still need to develop the means to obtain information necessary for planning and monitoring land use.

104. The need for participation of stakeholders in land-use decision-making is generally realized, but existing examples of how this can be achieved need to be more widely applied.

105. Special attention needs to be focused on bridging the gap between the objectives and activities of land users in exploiting the land resources available to them to generate production and income and the long-term objectives of the community in relation to preservation of natural resources and the environment. It is necessary to create economic and legal conditions which encourage and reward sustainable land use. Inappropriate land tenure systems are singled out as being one of the most frequently occurring disincentives in this regard. Countries will need to examine their land tenure systems, supporting legislation and administrative organizations to determine whether they are serving as deterrents to sustainable land-use practices. Where land tenure is a contributing cause of poor land management, reforms should be undertaken which will serve as stimulants to investment in long-term productivity while enhancing the security of tenure of those holders undertaking such investments. Positive land tenure reforms can be a powerful policy tool for sustainable development. They can also serve as a means of enhancing local participation in and acceptance of responsibility for a sustainable community resource base.

106. Attention needs to be paid to the development of linkages between traditional knowledge and land management systems on the one hand, and the application of science and technology on the other.

2. Proposals for action

107. Chapter 10 of Agenda 21 provides a comprehensive plan of action for developing and implementing an integrated land-use approach. An inter-agency meeting on chapter 10, held in Rome on 10 and 11 October 1994, stressed the need for the development of a holistic normative framework with the cooperation of all institutions and stakeholders which would address the growing and conflicting demands on land resources (for forestry, agriculture, human settlements, nature protection, biodiversity etc.), while avoiding land degradation.

108. The following are the main proposals presented for consideration and approval by the Commission on Sustainable Development:

Proposal 1. At the international level priority should be given to the development of a holistic and integrated framework to put in place social and economic conditions which will facilitate optimum matching of land resources with needs, in terms of production, sustainability, and conservation of biodiversity, together with the necessary technical and infrastructural support, which can be applied in any country with appropriate modifications, according to local needs and conditions.

Proposal 2. Each country should develop a national land use planning programme, containing a statement of objectives and a detailed timetable for implementation spread over a period of years, with the aim of removing constraints and providing incentives, enhancing the involvement and empowerment of peoples, developing information and management systems, and modifying institutions which are provided with suitable linkages among them.

Proposal 3. National Governments, institutions, and organizations of the United Nations system should initially cooperate in critical areas and in situations where opportunities are most appropriate for an integrated approach. These would include the following:

(a) Establishment of stable land-use systems in areas where important ecosystems or eco-regions are being endangered by human activities. This would include frontiers between cultivated and forest lands, between pastures and forest lands as well as between rainfed crop lands and range lands;

(b) Applying integrated planning and development approaches in regions which are becoming open to intensified settlement and agricultural production after eradication of human and animal health infestations, such as areas previously affected by river blindness or tsetse fly;

(c) Resolving land- and water-use conflicts of peri-urban areas and megacities, on issues such as treatment and reuse of solid and liquid waste, food production, appropriate housing, transport and other facilities;

(d) An integrated approach to capacity-building by means of joint training and regional workshops and consultancies, in order to facilitate intersectorial dialogue.

Proposal 4. National Governments, institutions, and United Nations agencies should collaborate in the development of:

(a) Basic but essential tools such as the classification of land cover and land use and mapping of eco-economic regions and life zones, the establishment and/or expansion of structures and programmes, such as AFRICOVER, that monitor and evaluate land use and environmental sustainability indicators, share and exchange the resulting knowledge base, and provide assistance and training for such monitoring;

(b) Maps and statistics showing how land is currently being used and in which areas that use is unsustainable;

(c) Geographical information systems on land resources and their use, as tools for land-use planning and decision-making.

Proposal 5. Periodic meetings and workshops should be held to exchange knowledge and experiences in the area of land resource planning and management, at:

(a) Various levels within individual countries;

(b) The regional level between countries with similar natural resources and socio-economic conditions;

(c) The global level, by relevant international organizations, in support of national needs.

Proposal 6. Individual countries or groups of countries should establish regional action frameworks in which countries and donor institutions volunteer to collaborate in joint development and implementation of improved land-use policies and programmes.

Proposal 7. National Governments and the international community, in consultation, should draw up by the end of 1995 the first draft of a covenant for good land use which would describe the general rights and obligations of all land users in relation to their neighbours and to other members of the community, in relation to the flora, fauna, and ecology of their lands, and as trustees of these lands for future generations. The covenant might subsequently be adopted by Governments as a policy document and might eventually become an attachment to land title deeds and tenancy agreements.

Proposal 8. Resources should be identified to support the activities of a working group which should draw up a detailed programme by the middle of 1995 for the achievement of the objectives of chapter 10, for adoption by countries at their discretion, and should propose arrangements to monitor and facilitate implementation.

Notes

1/ Report of the World Conference to Review and Appraise the Achievements of the United Nations Decade for Women: Equality, Development and Peace, Nairobi, 15-26 July 1985 (United Nations publication, Sales No. E.85.IV.10), chap. I, sect. A.

2/ See R. O. Oldeman, R. Hakkeling, and W. G. Sombroek, World Map of the Status of Human-induced Soil Degradation (Nairobi, UNEP, 1990). Funded by UNEP and implemented by the International Soil Reference and Information Centre.

3/ Rome, FAO, 1993.

4/ A. F. McCalla, "Agriculture and food needs to 2025: Why we should be concerned", Sir John Crawford Memorial Lecture presented to the Consultative Group on International Agricultural Research, Washington, D.C., October 1994.

5/ Rome, 1994

6/ Rome, 1992.

7/ "Settlement and development in the river blindness control zone", World Bank Technical Paper No. 192 (Washington, D.C.).

8/ "Development and the environment" in World Development Report, 1992 (Washington, D.C., World Bank, 1992).

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